

155Mbps, SFF LC Duplex Optical Transceiver Module for Fast Ethernet, ATM, SONET/OC-3, SDH/STM-1



Features:

- Full Compliance with the Optical Performance Requirements of the ATM 100Mbps and 100 Base-FX Version of IEEE 802.3u.
- Multi-Source 2×5 package styles with LC Receptacle.
- Single 3.3V Power Supply.
- PECL Differential Inputs and Outputs.
- PECL (LC-155B2xxxxxx Series) or TTL (LC-155B4xxxxxx Series) Receiver Signal Detect Indicator.
- RoHS Compliance
- Wave Solder and Aqueous Wash Process Compatible.

Description:

The LC-155Bxxxxxxx series are SFF (Small Form Factor) optical transceiver modules designed expressly for high-speed communication applications that require rates of up to 155Mbps. They are all compliant with the SONET/SDH standards.

The LC-155Bxxxxxxx transceivers are supplied in 2 ×5 DIP package style with duplex LC connector and are fully compliant with SFF Multi-Source Agreement (MSA).

The LC-155Bxxxxxxx transceivers can meet Class-1 eye safety standard and effective distance depending on ITU-T G.957 standard or power penalty.

The transmitter sections utilize 1310nm Edge Emitting InGaAsP Laser Diode. This Laser Diode is packaged in the optical subassembly portion of the transmitter section. A custom silicon IC that converts differential PECL logical signals into an analog LD driving current drives it.

The receiver sections utilize InGaAs PIN photodiodes coupled into a custom silicon trans-impedance preamplifier IC. These are packaged in the optical subassembly portion of receiver.

These PIN / Preamplifier combinations are coupled into a custom quantizer IC which provides the final pulse shaping for the logic output and the Signal Detect function. The data output is differential. The signal detect output is single-ended.

Application:

- Single-mode Fiber Backbone Links.
- Fast Ethernet and ATM Compatible.
- Single-mode Fiber Media Converter.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T _s	-40		85	°C	
Lead Soldering Temperature	T _{SOLD}			260	°C	
Lead Soldering Time	t _{SOLD}			10	Sec.	
Supply Voltage	V _{CC}	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Data Rate		100	155.52	200	Mbps	
Ambient Operating Temperature	T _A	0		70	°C	1
Supply Voltage	V _{CC}	3.15	3.3	3.45	V	

Note: See "Order Information" for detail

Electrical Characteristics

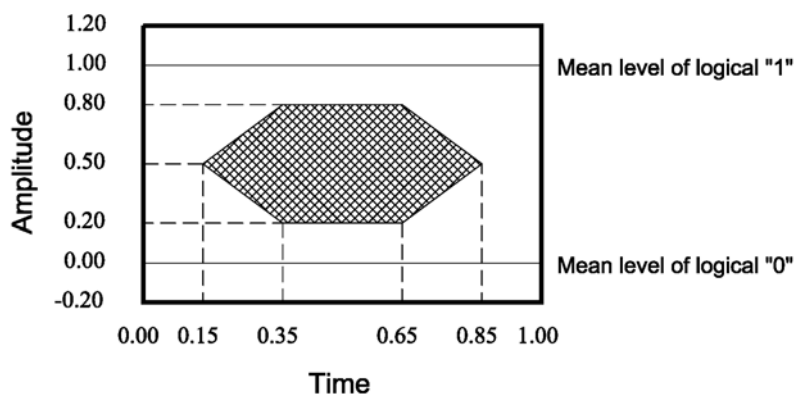
Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Transmitter Data Input Voltage-Low	V _{IL} -V _{CC}	-1.81		-1.48	V	
Transmitter Data Input Voltage-High	V _{IH} -V _{CC}	-1.16		-0.88	V	
Transmitter Disable Input-Low	V _{DISL}	0		0.8	V	
Transmitter Disable Input High	V _{DISH}	2		V _{CC}	V	
Receiver						
Data Output Voltage-Low	V _{OL} -V _{CC}	-1.95		-1.62	V	
Data Output Voltage-High	V _{OH} -V _{CC}	-1.045		-0.74	V	
SD Output Voltage-Low	V _{SDL} -V _{CC}	-1.95		-1.62	V	ECL Family
SD Output Voltage-High	V _{SDH} -V _{CC}	-1.045		-0.74	V	
SD Output Voltage-Low	V _{SDL}	0		0.8	V	LVTTTL
SD Output Voltage-High	V _{SDH}	2		V _{CC}	V	

Optical Characteristics

(Data Rate = 155.52Mbps, PRBS=2²³-1, NRZ, 9/125um SMF)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Supply Current	I _{CC}			150	mA	
Mean Launch Power	P _O	-15		-8	dBm	LC-155BxMxxxxxx
		-5		0		
Optical Extinction Ratio	E.R.	9			dB	
Center Wavelength	λ _C	1280	1310	1340	nm	
Spectral Width (RMS)	σ			7.7	nm	LC-155BxMxxxxxx
				3		
Output Eye Diagram	Compliant with ITU-T recommendation G.957					
Receiver						
Supply Current	I _{CC}			150	mA	
Sensitivity	P _{IN}			-31	dBm	LC-155BxMxxxxxx
				-34		
Overload	P _{SAT}	-8			dBm	LC-155BxMxxxxxx
		-10				
Signal Detect-Asserted	P _A			-31	dBm	LC-155BxMxxxxxx
				-34		
Signal Detect-DeAsserted	P _D	-45			dBm	
Signal Detect-Hysteresis	P _A -P _D	0.5			dB	

Note: The sensitivity should be tested at a BER of 1×10⁻¹⁰ or better with an input signal consisting of 155Mbps, NRZ, 2²³-1 PRBS and E.R.=9dB.

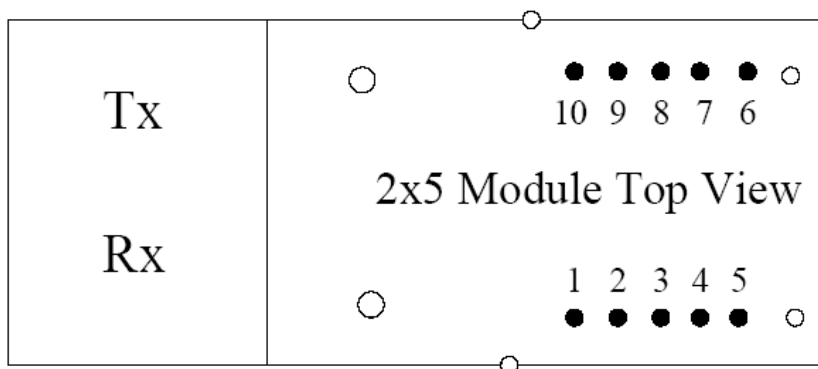


Optical Pulse Mask with Bessel Filter Specified in ITU-T G.957
Mask of the eye diagram for the optical transmit signal

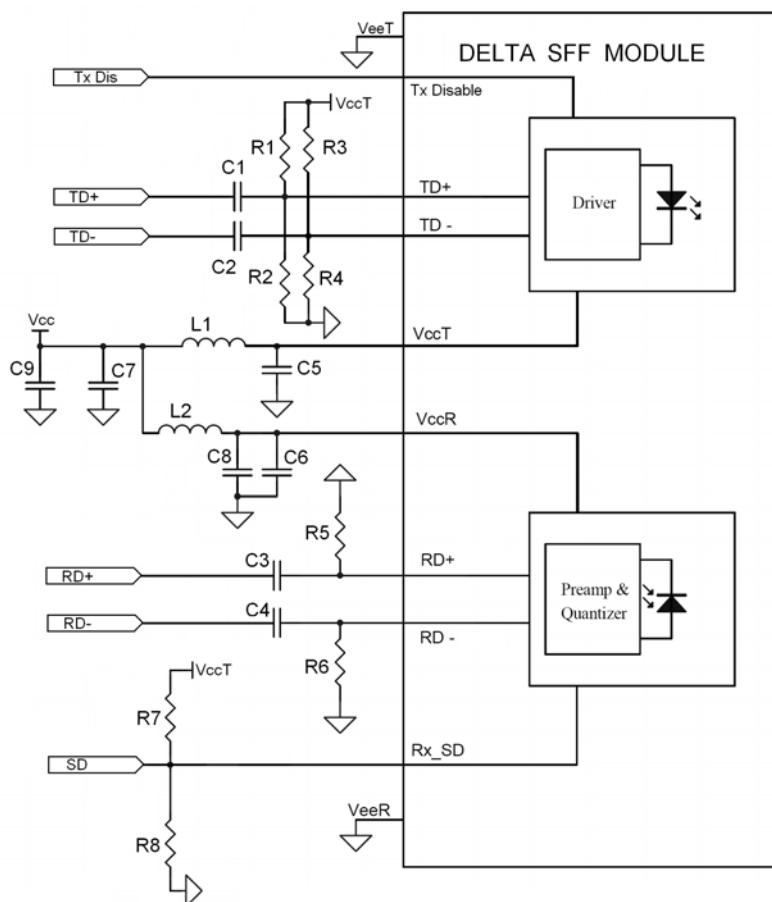
Pin Definition

PIN	Symbol	Functional description
1	GND	Receiver Signal Ground
2	VccR	Receiver Power Supply
3	SD	Receiver Signal Detect (LVPECL or LVTTTL)
4	RD(-)	Receiver Data Out Inverted (LVPECL)
5	RD(+)	Receiver Data Out Non-inverted (LVPECL)
6	VccT	Transmitter Power Supply
7	GND	Transmitter Signal Ground
8	TxDis	Transmitter Disable
9	TD (+)	Transmitter Data In Non-inverted (LVPECL)
10	TD (-)	Transmitter Data In Inverted (LVPECL)

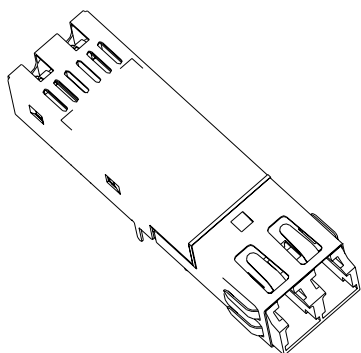
Pin Out Drawing



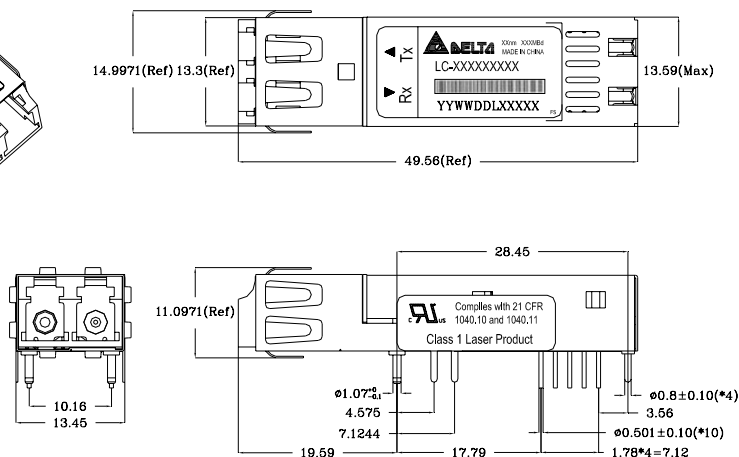
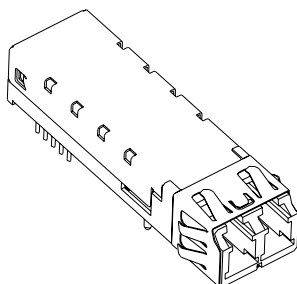
Recommended Circuit Schematic



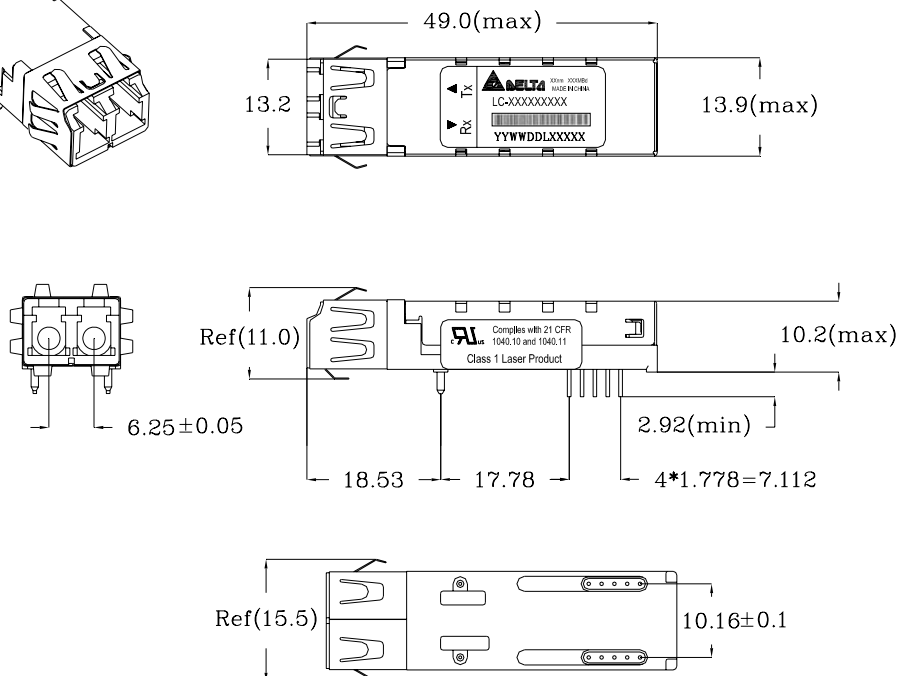
R1=R3=82 ohm (3.3V),68 ohm(5V)
 R2=R4=130 ohm (3.3V),191 ohm (5V)
 R5=R6=150 ohm (3.3V),270 ohm (5V)
 R7=130 ohm (3.3V PECL),82 ohm(5V),NC (TTL)
 R8=82 ohm (3.3V PECL),130 ohm(5V),NC (TTL)
 C1=C2=C3=C4=C5=C6=C7=100 nF
 C8=C9=10uF
 L1=L2=1uH

Package Outline (Plastic Housing) :


UNIT: mm
TOLERANCE: ± 0.2


Package Outline (Metal Housing):


UNIT:mm
TOLERANCE: ± 0.2



Regulatory Compliance

Feature	Reference	Performance
Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B (CISPR 22A)	(1) Satisfied with electrical characteristics of product spec. (2) No physical damage
Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	
Electrostatic Discharge to the Duplex LC Receptacle	EN 61000-4-2 IEC 1000-4-2 IEC 801.2	
Electrostatic Discharge to the Electrical Pins	MIL-STD-883E Method 3015.7	
Eye Safety	US FDA CDRH AEL Class 1 EN 60950: 2000 EN 60825-1: 1994+A11+A2 EN 60825-2: 2000	CDRH File # 0321539-00 TUV Certificate No. R50032471
Component Recognition	Underwriters Laboratories and Canadian Standards Association Joint Component Recognition for Information Technology Equipment Including Electrical Business Equipment	UL File # E239394

Order Information

LC- 155BX₁X₂X₃X₄X₅X₆

X₁ Power Supply Voltage and SD Level

2: 3.3V; Data In/Out (PECL); SD Output (PECL)
4: 3.3V; Data In/Out (PECL); SD Output (TTL)

X₂ Effective Distance Grade

J: 15Km
M: 40Km

X₃ Package type & coupling type

1: 2×5 LC DC/DC

X₄ RoHS

Blank: Non-RoHS Compliant
R: RoHS Compliant

X₅ Housing Type & Revision Code

A: New Design
P: Plastic Housing
M: Metal Housing

X₆ Temperature

Blank: 0 to + 70 degree C
H: -10 to + 85 degree C
T: -40 to + 85 degree C

Appendix A · Document Revision

Version No.	Date	Description
0G	2006-11	Release
0H	2008-01	Correct "Recommended Circuit Schematic"、Pin Definition、Order Information